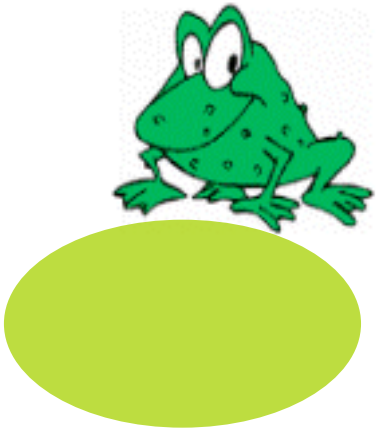
KINDERGARTEN
Number and Number Sense



Number Boards

Format: Whole class, partners

SOL Objectives:

K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.7, K.14

Vocabulary: Varies depending on clues given

Materials: One number board; two sets of digit cards for each pair or group

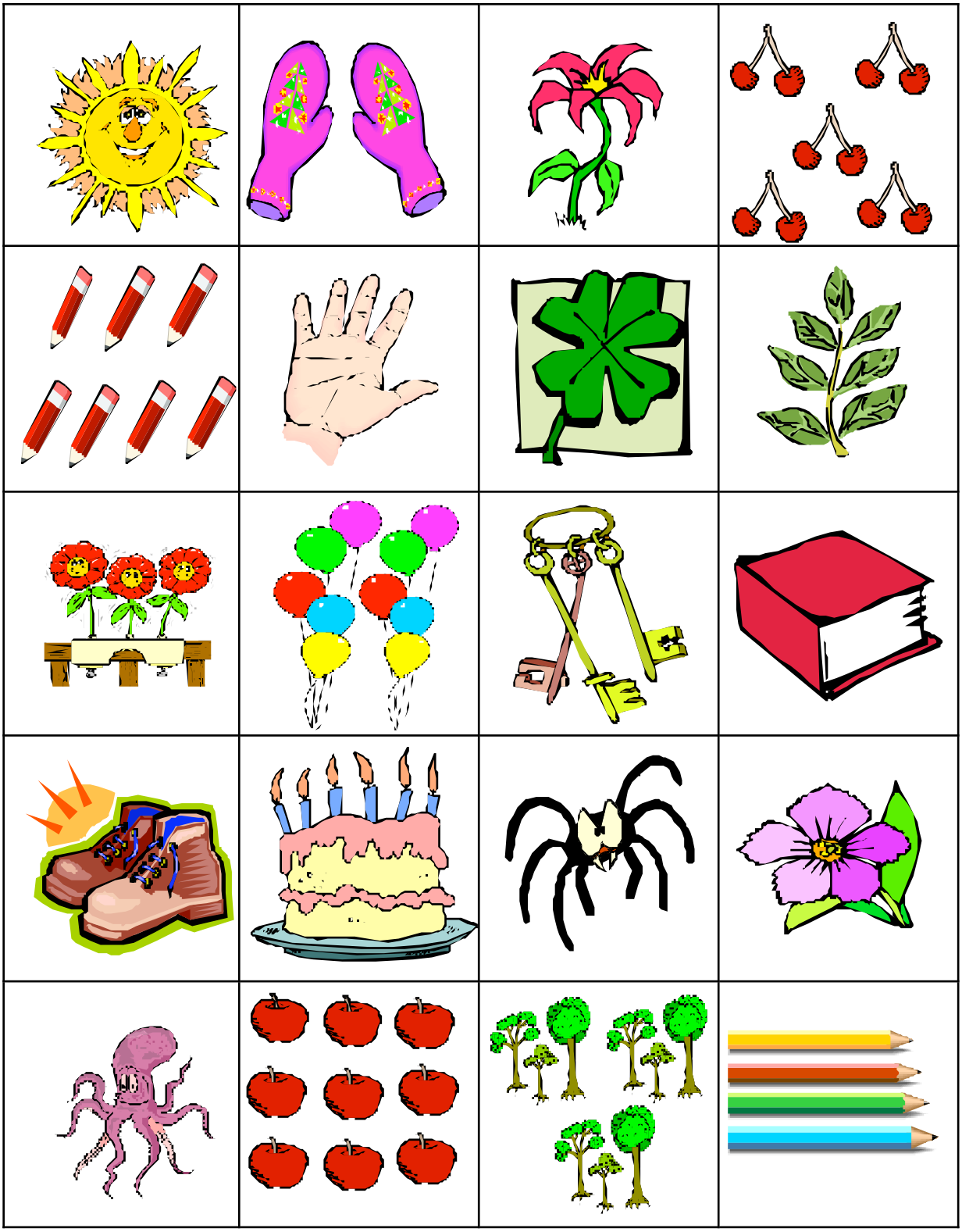
Time Required: 10 minutes

Directions

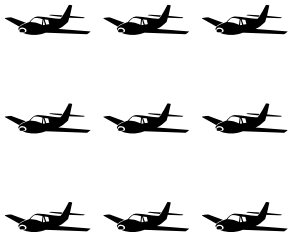
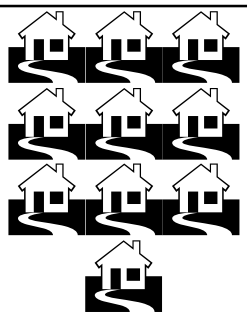
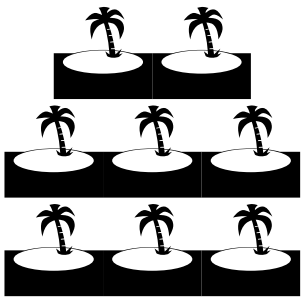
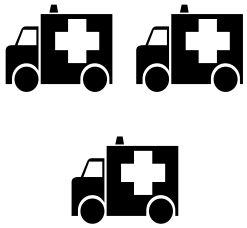
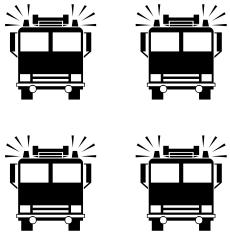
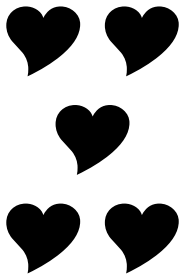
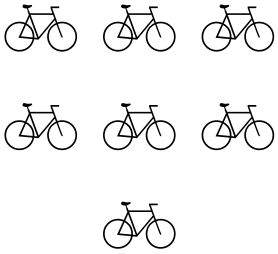
1. Direct students to work with a partner to cover the spaces on a number board, based on clues given by the teacher. Each number board has two representations for the numbers from 1 to 10. After providing a clue, have each student choose the appropriate number card and cover a corresponding space on the number board.
2. Representations for the numbers on the number boards may vary so as to give students experience with thinking about the numbers in a variety of forms. You may create different number boards as needed.
3. Clues for the numbers will vary depending on the students' needs and your goals. One number can be left uncovered for a quick check of accuracy at the end of the activity. "Which number is not covered on your board?"
4. Examples of clues:
   • Cover the number that is one more than 4.
   • Cover the number of pennies equal to one nickel.
   • Cover the number that comes right before 6.
   • Cover the number of legs that a puppy has.

(Note: You should develop additional clues as appropriate. Clues may include a variety of concepts or concentrate on a specific skill.)

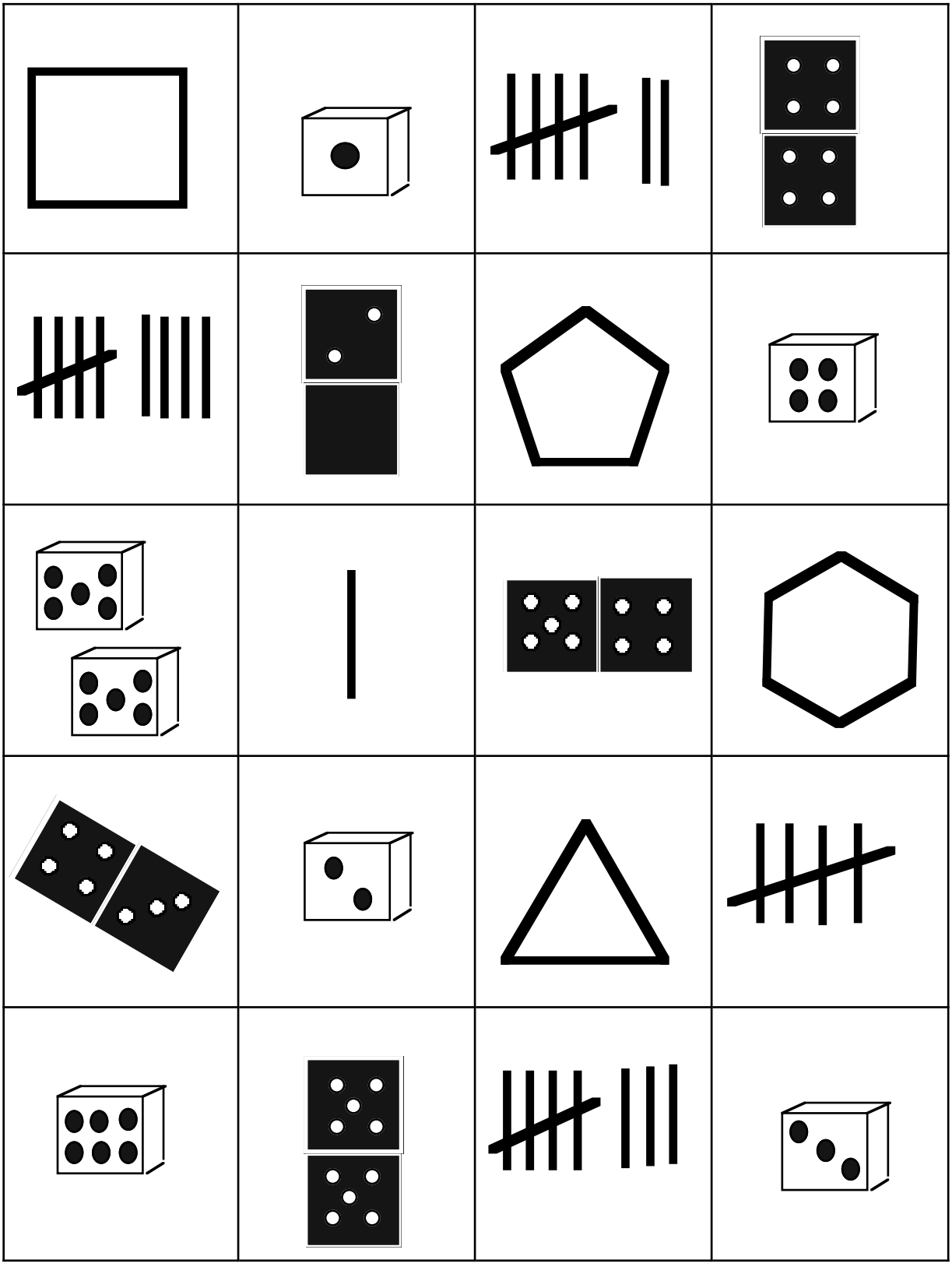
Number Board 1



Number Board 2

2			3
5			8
	9	1	
	6		
4		10	7

Number Board 3



Digit Cards (copy and cut apart)

1	2	3	4
5	6	7	8
9	10		

Build and Compare

Format: Whole class, partners

SOL Objectives:

K.1 The student, given two sets containing 10 or fewer concrete items, identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.

Related SOL: K.2, K.5, 1.1

Vocabulary: *Number words*, *more*, *less*, *same*, *bigger*, *smaller*, *equal*

Materials: Deck of cards (with face cards removed); linking cubes

Time Required: 10 minutes, whole class; 15 to 20 minutes in partners

Directions:

1. Share number cards 1 to 10 with students. Ask them to tell something about each number shown. Using 10 as an example, students might count the number of fingers they have, share that $10 is a lot of money, or point out that 10 is a number bigger than six. Try a few different numbers to get students talking and sharing what they know about each number.
2. Have two students hold up different number cards and compare their numbers. Ask, "Which is more/less? How do you know?"
3. Teach students the game of "Build and Compare." Shuffle a deck of cards (face cards removed) and deal the cards evenly between the two players (facedown in two piles). Players say in unison, "1, 2, 3, compare," as each turns over the top card.
4. Each player states his or her number. "I have a _____" and "I have a ___." Then the players call out, "Build it!" and use linking cubes to build a tower to represent their numbers. After the towers are built, the two players compare their towers and their numbers using *more*, *less*, and *same* vocabulary. For example, "Six is more than four" and "Four is less than six." The two number cards are then put into the used pile and another set is drawn. The game ends when all the cards have been compared. Shuffle and play again!

Exploration Questions:

- Tell me a number that is bigger than___.
- Which is bigger? How do you know?
- What do you notice about the two towers?

Variations:

- Play with number cards or 10-frame cards instead of regular playing cards.
- Play with numbers 1 to 5 only.
- Play with numbers 11 to 20.

Garbage!

Format: Whole class, partners

SOL Objectives:
K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.5, 1.3, 1.4

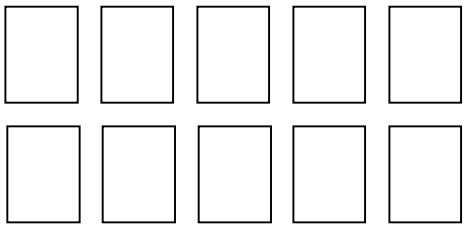
Vocabulary: *more than*, *less than*, *greater than*, *before*, *after*, *counting on*, *counting back*

Materials: Large deck of cards for display; regular decks of cards with face cards removed (one deck per partner set, or small groups of three) or decks made from 10-frame cards (attached)

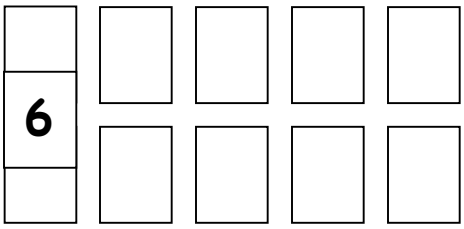
Time Required: 15 minutes, whole class; 15 to 20 minutes in partners

Directions:
1. Place cards 1 to 10 randomly on the floor. Have students share numbers they recognize and can name. Ask, "Are the cards in order?" Have students share ideas about the order of numbers 1 to 10.

2. Teach students the game "Garbage." Shuffle a deck of cards with the Jack, Queen, King, and Jokers removed. Deal 10 cards facedown to each player. Place extra cards in the draw pile. Players arrange their cards (facedown) in a 10-frame pattern as shown below.



3. The first player takes a card from the draw pile and looks at it. The player names the card and then places it in the proper place by counting. For example, "I have a 6 and it goes in the 1, 2, 3, 4, 5, 6 space." The 6 is placed face up and the card underneath is revealed.



4. The card revealed under the 6 is then named, and the player tries to explain where it goes in relation to the first card (i.e., the 6). For example, if the uncovered card is a 10, the student might

say, "10 is more than 6," and count on from 6 to get to 10. Or, the player may have to start back at 1 to count all the way to the 10's space. Once the appropriate space is determined, that card is placed faceup and the card beneath it is revealed. With each play, the student tries to articulate how the two numbers relate to one another in order to place the new card.

5. Play continues until a card is revealed that has already been played. If the player uncovers a card that has already been placed (faceup), he or she calls, "Garbage!" and puts that card into a pile next to the draw pile.

6. Player Two begins the same way, by drawing from the draw pile. Or, the player may use the top card in the "garbage" pile to start play.

7. Each time "Garbage!" is called, play transfers to the next player. The object of the game is for the players to reveal and order their cards from 1 to 10. The game is over when the first player achieves that objective.

8. You should observe and listen for students to use *counting on*, *counting back*, *before,* and *after*, as well as other strategies to describe the placement of each number.

Exploration Questions:

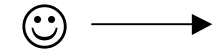
- How did you know where the ___ went?
- Which numbers are you missing?
- Is there another way you know that the number goes in that space?
- What do you know about these two numbers: ___ and ___?
- Can you tell me where ___ goes? Is it before or after ___? How do you know?

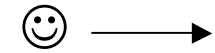
Variations:

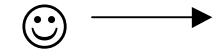
- Use 10-frame cards (attached) instead of regular playing cards. You will need three sets of 1 to 10 for each partnership.
- Play with numbers 1 to 5, slowly adding numbers to the game as the first five are mastered.
- Play with teen numbers (up to 20), ordinal numbers, fractions, and/or decimal numbers.

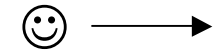
10-Frame Cards

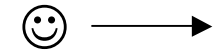
(copy and cut out three sets per pair)

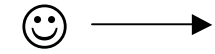


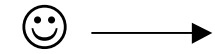


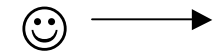


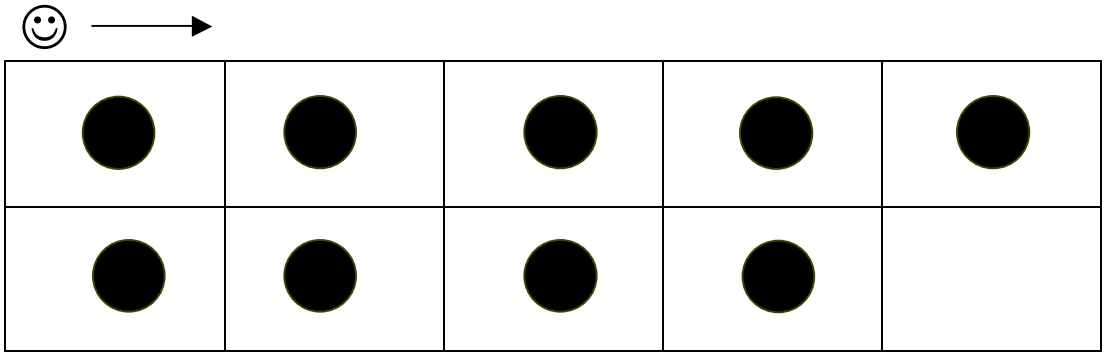


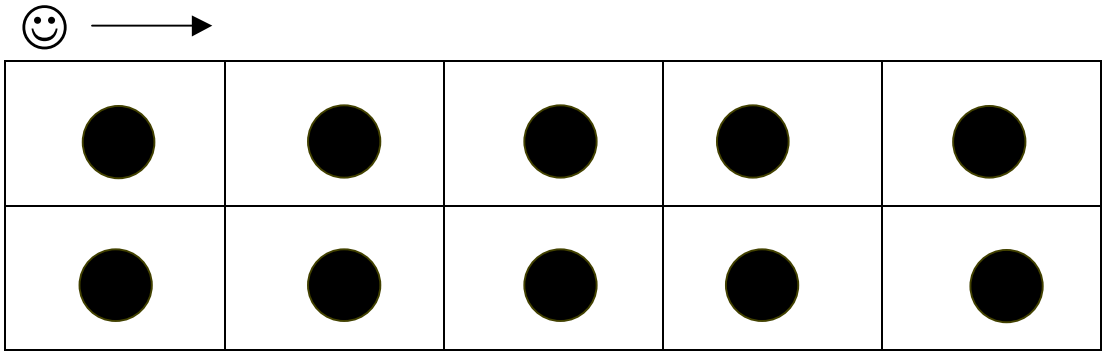












How Many?

Format: Whole class

SOL Objectives:
K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.5, K.6, K.12, K.17, 1.8

Vocabulary: *count*, *total*, *more*

Materials: Overhead projector; magnetic counters; magnet wand; Bingo supplies

Time Required: 20 minutes

Directions:
This activity helps develop fluency with composing and decomposing numbers, meaning that a whole number can be broken down into multiple addends. Decomposition of numbers is necessary to support a rich place value concept and a sound basis for mental computation.

1. Place 6 to 10 counters randomly on the overhead projector. Have the students determine the total number of counters shown and describe their counting strategies.
2. Turn the projector off and use the magnet wand to pick up some of the counters. (Students should not see how many counters are on the wand.)
3. Turn on the projector. Have students identify the number of counters showing.
4. Ask students, "How many counters are on the wand? How do you know?"
5. Replace the counters from the wand and repeat, picking up a different number of counters with the magnet wand each time.

Exploration Questions:
- What is the missing part of (target number)? How do you know?
- Is there another way to make (target number)?
- Can you think of all the combinations to make (target number)?
- How can you be sure you have made all the combinations?

Variations:
- Larger numbers of counters can be used (up to 20).
- Counters can be arranged spatially (e.g., in rows of two or groups of three).
- Number sentences (symbols) can be introduced for recording purposes.

Lily Pad Hop!

Format: Whole class, small groups, partners

SOL Objectives:
K.5 The student will count forward to 30 and backward from 10.

Related SOL: K.2, 1.3

Vocabulary: *counting*, *number words*, *dots* or *pips*

Materials: Game board; number cube; markers/counters; green construction paper circles for lily pads; *Jump, Frog, Jump!,* by Robert Kalan

Time Required: 10 to 15 minutes

Directions:
1. Ask students to share some things they know about frogs. What do they do? Read students the book, *Jump Frog, Jump!* In the story, there are a variety of animals. The frog gets around by jumping or hopping.
2. Have students pretend they are frogs and hop. Ask, "How can we tell how far the frog has gone?" (Answer: "We can count his hops.") Have students call out a number and hop that many times, getting their whole bodies involved in counting.
3. Lay out the green circles as lily pads. Have students hop and count how many lily pads they land on. Each time a student frog lands, talk about counting hops. The other students can use their hands and hop on their legs to get the feel of hopping and counting together, practicing one-to-one correspondence.
4. Teach students to play "Lily Pad Hop." Each set of partners or small group needs a game board, a number cube, and markers/counters. For each turn, the player rolls the number cube, names the number rolled, and then moves one of the markers/counters across the board. The object is to get all of the frogs to the pond or lily pad. If a frog gets to the pond and the player still has hops remaining, the student can move another frog toward the pond. In other words, players can split their hops between two frogs if needed. The game is over when all of the frogs get to their ponds.

Exploration Questions:
- How many more spaces do you have to get to the lily pad, or to the end? How do you know?
- Are you halfway there? How do you know?
- Do hops and number names stay together?

Variations:
- Play with regular six-sided die with pips (small dots).
- Play continuously by letting the frogs start over each time they reach the pond.

Lily Pad Hop! Game Board

 10	 10	 10	 10
9	9	9	9
8	8	8	8
7	7	7	7
6	6	6	6
5	5	5	5
4	4	4	4
3	3	3	3
2	2	2	2
 1	 1	 1	 1

Quick Images

Format: Whole class

SOL Objectives:
K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.1, K.5, K.6, K.12, K.17, 1.3, 1.8

Vocabulary: *more*, *fewer*, *less*, *above*, *below*, *beside*, *group*, *set*

Materials: 10-frames, or dot cards

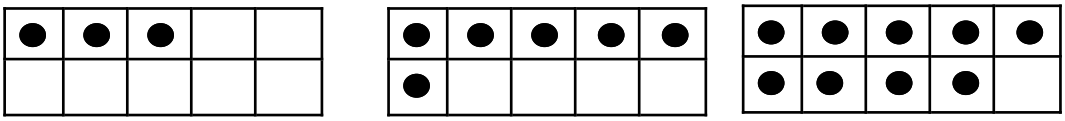
Time Required: 10 minutes

Directions:
1. Present the students with a dot card, or 10-frame, for approximately 5 seconds.
2. Ask students to report the total number of dots, and describe how they got that answer.
3. Encourage students to share different strategies. For example, when presented with a 10-frame that has eight dots, some students may see it as five and three more, while others may see two fewer than 10. An arrangement of five dots, such as those seen on a standard die, might be seen as two groups of two dots plus one more, or a group of three above another group of two.
4. Repeat this activity frequently with a variety of numbers and spatial arrangements.

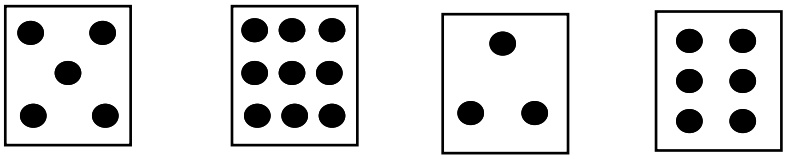
Note: Creating and using specially patterned arrangements to represent numbers encourages students to create mental images that are important for developing fluency in composing and decomposing numbers with automaticity. The 10-frame model is especially useful for developing ideas about the benchmark numbers of 5 and 10.

Variations:
- Dominoes, playing cards, and standard number cubes all have representations of common spatial arrangements for numbers. Multiple experiences with each of these help develop student understanding.
- *Math for All Seasons* and *The Grapes of Math*, both by Greg Tang, encourage the reader to use spatial arrangements to solve math riddles.

10-Frame Examples



Dot Card Examples



How Many Snails?

Format: Whole class

SOL Objectives:

K.1 Given two sets containing 10 or fewer concrete items, identify and describe one set as having more, fewer, or the same number of members as the other set, using the concept of one-to-one correspondence.

Related SOL: K.2, K.5, K.6, K.12, K.17, 1.3

Vocabulary: *more*, *less*, *same*, *how many*, *count*, attribute words (e.g., *color*, *design*, *size*)

Materials: *How Many Snails?,* by Paul Giganti and Donald Crews; art materials (paper, markers, crayons, or paint)

Time Required: 20 minutes

Directions:

1. Read *How Many Snails?* to the class. The book provides many opportunities for counting sets and subsets on every page. Encourage students to take turns counting and discussing their counting strategies as the book is read.
2. Ask students to compare one group to another group on the page: "Are there more, fewer, or the same number in the two groups?"
3. Given appropriate art supplies, have each student draw a picture of a balloon. Tell the students that they should try to make their balloon unique.
4. Make a display with all the balloon pictures. (This could be done on a bulletin board or on chart paper.)
5. Allow students to develop questions about the number of balloons that other students can answer. (e.g., How many balloons are red? How many balloons are striped? Are there more round balloons or long balloons?)

Variations:

- Students' pictures can be related to a theme or season (e.g., snowmen in the winter, flowers in spring).
- Students' drawings can be sorted and/or placed to create a physical graph based on given attributes.
- Students can take turns sorting the pictures and having other students guess what attribute was used for sorting.

Spill the Beans

Format: Whole class, partners

SOL Objectives:

K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.5, 1.1

Vocabulary: *and*, *plus*, *equal*, *make*, and other addition words

Materials: Raw lima beans painted on one side and left white on the other (or two-color counters); plastic cups; recording sheets; crayons

Time Required: 10 minutes, whole class; 15 to 20 minutes in partners

Directions:

1. Show students the beans. Count out five together. Ask, "What might happen if you spill the five on the floor? How might they land? What are the possibilities?" Let students share their ideas.
2. Shake five and spill them. Ask, "How did they land? How many colored? How many white? How many in all? What if we spilled them again, how might they land? Will it be the same?" Let the students share their ideas.
3. Shake the beans, spill them, and talk about how they land.
4. Teach students how to play "Spill the Beans." Students will use between five and nine beans. Count out the beans and place in a cup. Students say, "Shake, shake, shake, and spill," while shaking the cup and spilling the beans on the table. Have students separate the beans by colors and record how many of each by coloring a row on the recording sheet. (You may want to give specific directions for coloring, e.g., color all the colored counters first and then leave the rest white.) Repeat again and again until the students feel they have found all possible combinations.
5. Come back together as a class and talk about how students might know that they found all of the different combinations.
6. List all the combinations on the board and talk about the patterns that can be seen. Ask, "What happens to the number of colored beans as the number of white beans increases? Why is this so?"

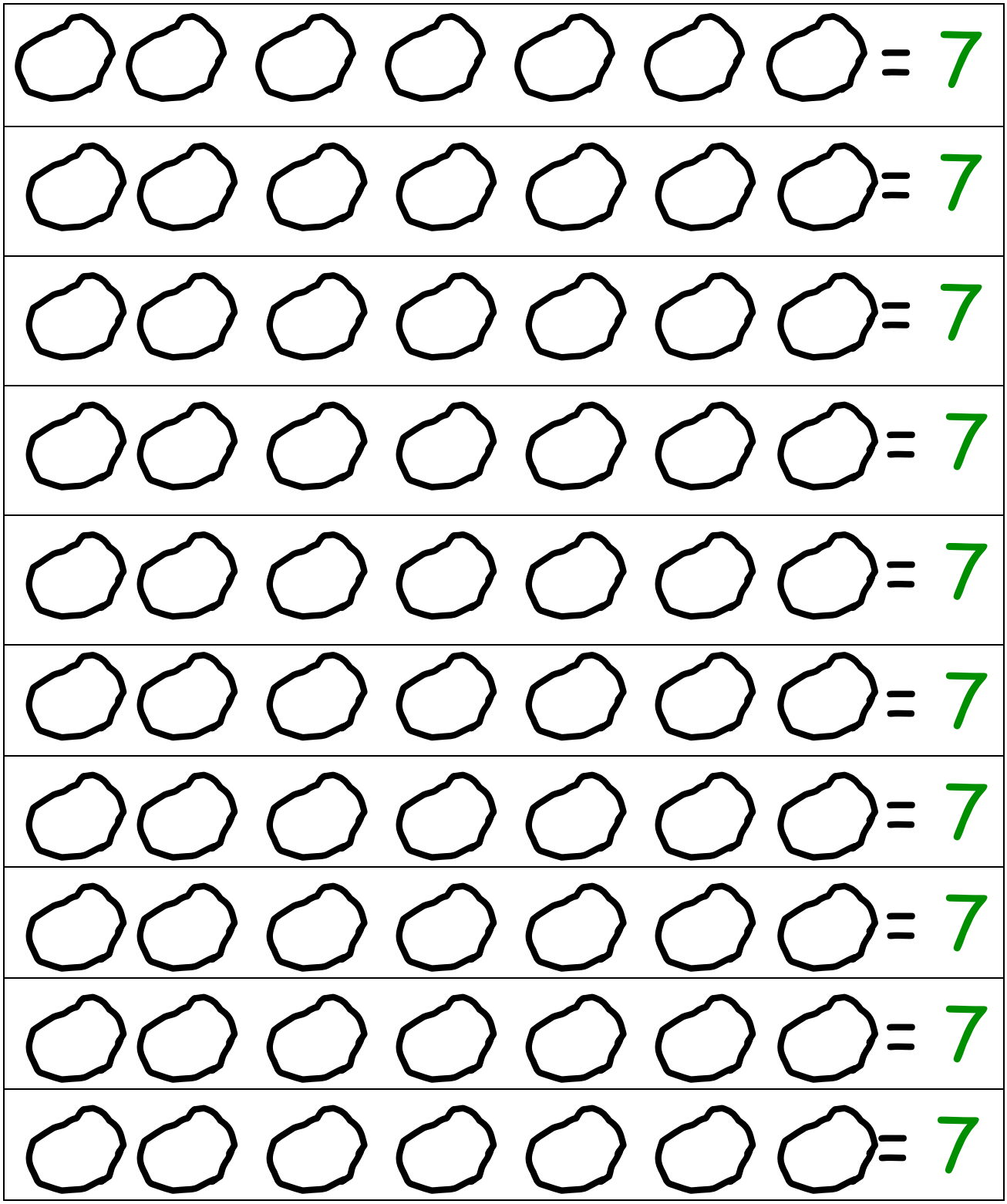
Exploration Questions:

- What are some ways you can make ___?
- What goes with _____ to make _____?
- Is there another way to make ___?
- How will you know when you have all the combinations of ___?

Variations:

- Try other numbers or sets of beans.
- Record numbers along with pictures of beans.
- Add symbols or number sentences to be completed, such as __ + __ = __.
- Have students cut the recording sheet apart by rows to organize their results and discuss the resulting patterns.

Recording Sheet (example for seven beans)



Splash!

Format: Small groups

SOL Objectives:

K.2 The student, given a set containing 10 or fewer concrete items, will
a) tell how many are in the set by counting the number of items orally;
b) select the corresponding numeral from a given set; and
c) write the numeral to tell how many are in the set.

Related SOL: K.1, K.3, K.5, K.6, K.12, K.17, 1.8

Vocabulary: *first*, *second*, *third*, *more*, *less*, *same*

Materials: *Splash!,* by Ann Jonas; counters; story mats

Time Required: 20 minutes

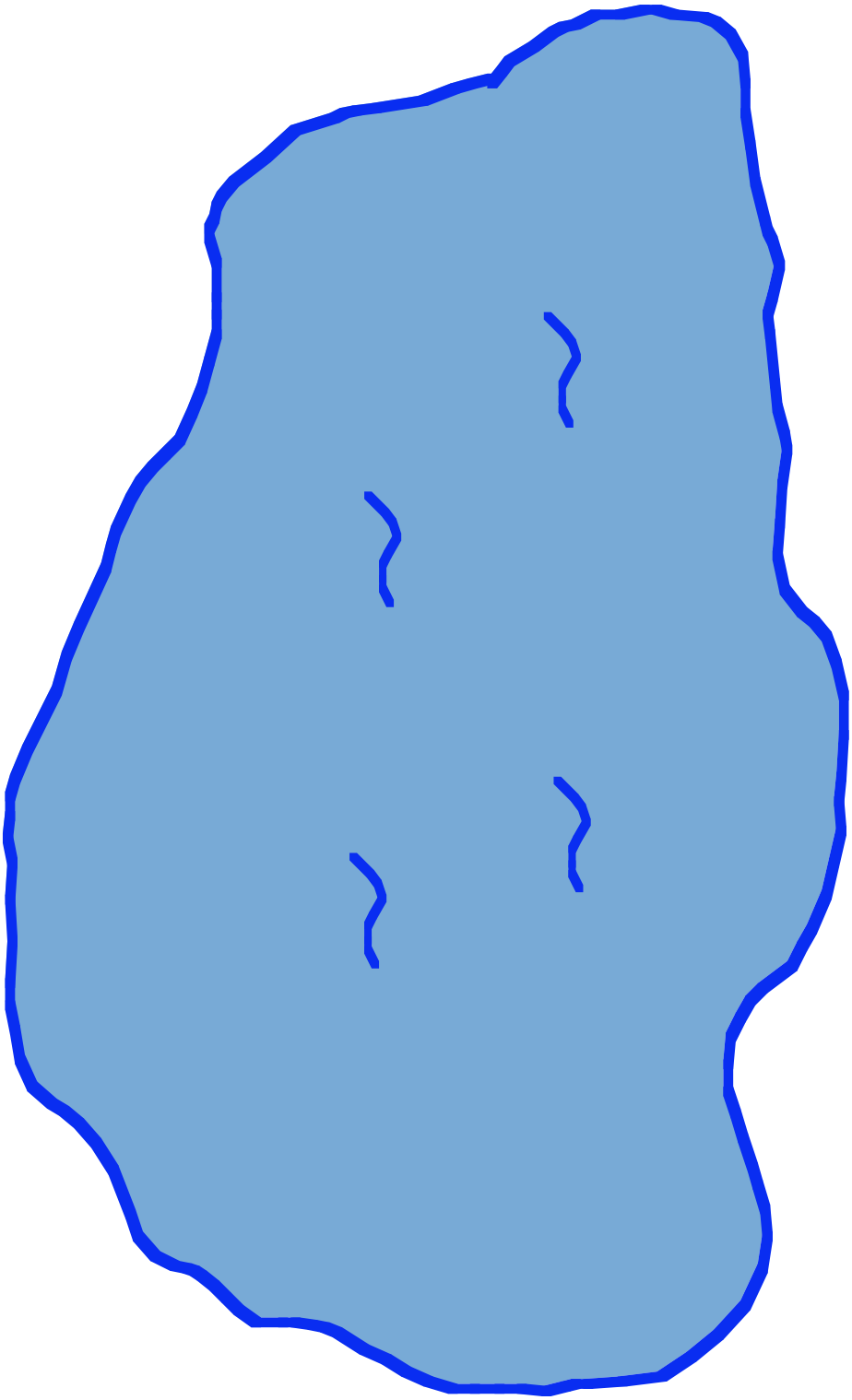
Directions:

1. Read the book, *Splash!*, to the class.
2. Provide each student with a story and some counters.
3. As you read the story, have students use the counters to model the characters' movements in and out of the pond.
4. Pause frequently to ask how many animals are in the pond and how many are out.
5. Have students compare the number of animals that are in the pond to the number of animals that are out of the pond. Ask, "Are there more, less, or the same number? How do you know?"
6. Ask students to identify the animals that went in the pond first, second, and third.
7. Create new "splash" stories for the students to act out and describe.

Variations:

• Number sentences can be written to record the events in the story.
• Students can use the counters and mats to model and describe additional scenarios.

Story Mat



Counters

(copy and cut out one set for each student)